AEROSPACE DEFENSE COMMAND

REQUIRED OPERATIONAL CAPABILITY (ROC)

FOR

SPACE DEFENSE SYSTEM

ADC ROC 10-74

HEADQUARTERS

AEROSPACE DEFENSE COMMAND

ENT AIR FORCE BASE, COLORADO 80912

1 NOVEMBER 1974

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AEROSPACE DEFENSE COMMAND
ENT AIR FORCE BASE, COLORADO 80912

REPLY TO ATTN OF: XPQDQ

SUBJECT: Required Operational Capability (ROC) for Space Defense System

TO: See Distribution

1. The attached ROC is submitted for your approval and necessary action in accordance with AFR 57-1 as amended. Request information addressees make comment, if appropriate, direct to Hq USAF/RDQSD, with an information copy to Hq ADC/XPQDQ.

2. This ROC addresses an urgent space defense requirement and has been assigned a tentative priority of 3 on the command ROC listing. Upon validation, it will supersede ADC ROC 8-71 dated 30 June 1971. This requirement has been coordinated with AFSC and no major points of disagreement exist.

Timothy I. Ahern

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1 Atch
ADC ROC for Space Defense System [redacted]

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AEROSPACE DEFENSE COMMAND
ENT AIR FORCE BASE, COLORADO 80912

Title: Required Operational Capability (ROC) for Space Defense System — ROC No: 10-74

Action Officer: Lt Col D. H. Ziegler, XPQDQ, 3054 — Date: 1 Nov 74

I. [redacted] (U) Deficiencies/Needs.

A. [redacted] The ability to negate satellites in space is fundamental to defending the right of the United States to use space and insuring that no enemy uses space to gain a military advantage. Absence of a U.S. negation capability implies freedom for potential enemies to move operations currently vulnerable to U.S. land, sea, and air forces into space as a sanctuary free from threat.

B. [redacted] Since the advent of space operations, military programs have been mitigated by treaties barring weapons of mass destruction from space deployment. However, this has not prevented the use of space for support type operations to enhance effectiveness of land, sea, and air forces. The importance of these space operations to successful military operations has clearly increased with time and further growth is projected. What we see as a near-term space threat is not the overt threat of mass destruction from orbiting weapons. In the far term, space weapons may evolve which will be capable of employment in space-to-space, space-to-air, and space-to-surface modes. For the near term, the threat of increasingly successful military operations in other media (land, sea, and air) through use of space systems requires urgent counter capability. It is this more subtle threat toward which this ROC is directed.

C. [redacted] The space environment is of strategic and tactical value to both the U.S. and Soviet Union. In the past, the Soviets have been limited in global military operations due to lack of foreign basing agreements and lack of a world financial, industrial, and political structure necessary for support and operation of forces beyond limits of the Motherland. Today, the U.S. is facing similar problems as allies exercise more independence and operation of overseas installations becomes less dependable. Therefore, for both the U.S. and the Soviets, an economical and effective environment for support and control of global military operations is space.

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D. [redacted] The Soviets recognized this situation early and developed a space capability that today plays a vital part in their political and military operations by providing a global strategic and tactical support capability relatively free of overseas influence. In addition, the practically non-existent capability of the U.S. to defend in space has permitted their conduct of military space operations almost completely free from the threat of U.S. forces.

E. [redacted] The requirement for a satellite negation capability is contained in the space defense mission which requires denial of hostile acts in space.[1, 2, 3] These may be either passive or active in nature. The use of satellites to support military operations is a passive hostile act.[4] The use of space weapons is an active hostile act.

F. [redacted] The Soviet Union currently has about 70 active military satellites in orbit. They perform photographic reconnaissance, communications, electronic intelligence, meteorology, ocean surveillance, and navigation support missions. Development of ballistic missile surveillance satellites may also be in progress. Intelligence predicts that by 1981 the number and sophistication of Soviet satellites will increase markedly.[5] The Soviets also have space weapons that could be launched as needed, the fractional orbit bombardment systems (FOBS)[6] and anti-satellite systems (ASAT).[7] The primary need for a U.S. satellite negation force stems from the need to deny military support from satellite systems.

G. [redacted] U.S. satellite negation capability now resides in the nuclear armed Program 437 which is scheduled for phase-out in FY75. The Safeguard ABM system will have some capability; however, its limited field of fire will permit engagement of only a small part of the total threat. Furthermore, constraints on operational employment of a nuclear negation system are unacceptable. A non-nuclear satellite negation system is therefore required in sufficient quantity to be effective against the threat.

II. [redacted] (U) Required Operational Capability.

A. [redacted] (U) The Threat.

1. [redacted] The required operational capability is based on the demonstrated and projected Soviet space threat. A small space threat is projected for the Peoples Republic of China (PRC); however, it is not used for quantitative derivation of satellite negation requirements because of

its small size in comparison to the Soviet threat and the fact that no part of it has been demonstrated.

2. [redacted] All satellites in the demonstrated threat have perigee below 850NM altitude except those (2 in 1974) in geostationary orbit at about 20,000NM altitude. About 10 or 12 of the operational satellites with perigee below 850NM are in highly elliptic orbits with apogees around 20,000NM.

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4. [redacted] Military support provided by Soviet satellites is already of significant value and will increase markedly in quantity and quality in the future. A non-nuclear satellite intercept force will equip the U.S. to selectively negate those systems which contribute most to enemy capability in a given conflict. In one situation it may be desirable to negate the network of ocean surveillance satellites; in another, the targets may be navigation and electronic intelligence satellites. The overall objective generally will not be to clear space of all potentially hostile satellites, but rather, to deny specific tactical support from space during crisis or conflict.

B. [redacted] (U) Operational Requirements.

1. [redacted] Considering the Soviet space threat, as described in Attachment 1, the following operational capability is required. Within 24 hours of an execution order, negate

b(1) resident satellites in orbits below 1000NM

b(1) resident satellites in 12 hour elliptic orbits

b(1) resident satellites in orbits above 1000NM.

In addition, a quick reaction capability is required to negate

b(1) newly launched satellites in orbits below 1000NM before they complete two orbits.

2. [redacted] The satellite negation force must employ non-nuclear warheads because testing or using nuclear weapons in space would violate international treaties. Employment of a nuclear force would also be constrained by collateral damage considerations for friendly satellites. Furthermore, military satellites are of considerable value in conventional conflict and the U.S. must have the option of negating them by conventional means without crossing the nuclear threshold and raising the specter of nuclear warfare.

3. [redacted] A non-nuclear satellite negation system would provide the National Command Authority (NCA) with unique flexible response options. It could be used to significantly degrade enemy capability with only a relatively small non-nuclear attack. The attack would not violate sovereign territory, would cause no loss of life, create no risk of collateral damage, and would be a straightforward two-party interaction, unhindered by multilateral treaty obligations, foreign basing agreements, or overflight restrictions. Furthermore, in a closed society like the Soviet Union, the events occurring in space could be isolated from public awareness and the consequent pressure of public opinion. This would permit the U.S. to demonstrate resolve over an issue by attacking a military space system and would give the Soviet government the option of responding on the basis of logic rather than being driven by emotional pressures from their public.

4. [redacted] It is important to note that the Soviets can operate in this developing portion of the conflict spectrum at the present time. They have an operational non-nuclear satellite interceptor which has been tested successfully on five separate occasions. If they choose to use it against U.S. satellites, it may be difficult to find an appropriate response in the absence of a non-nuclear negation system.

C. [redacted] (U) Operational Concept.

1. [redacted] As explained in Attachment 2, a satellite intercept force is preferred over other means of negation. This preference is based on the requirement for a system capable of prompt, high confidence negation which can be fully deployed and operational no later than 1982. The operational concept described here assumes a negation force using rocket-type interceptors.

2. [redacted] Analysis has shown that a mix of essentially off-the-shelf boosters provides the lowest cost force: one

type for low altitude targets, a second for elliptic satellites, and perhaps a third for high altitudes. The interceptors become more expensive as target altitude increases. A mix is expected to cost less than a force utilizing just one type booster capable of operating at all altitudes.

3. [redacted] The following systems have been identified as promising candidates: an air-launched missile, perhaps a modified SRAM, for targets below 1000NM; a medium altitude ground-launched missile, perhaps a modified MMII, for targets in elliptic orbits; and a high altitude missile, perhaps a modified MMIII, for targets in the geosynchronous class of orbits around 20,000NM altitude or for quick reaction missions. For the purpose of describing an operational concept, a mixed deployment of these interceptors will be assumed. Deployments will be defined in detail during the development phase of activity.

4. [redacted] Air-launched interceptors could be based at one air defense base on the East Coast and one on the West Coast. This would assure intercept opportunities against low altitude satellites during, or before, their first series of passes over the CONUS and permit booster impact in the oceans. Candidate bases are Langley AFB or Tyndall AFB on the East Coast, and Castle AFB or McChord AFB on the West Coast.

5. [redacted] Ground-launched interceptors could be based at Vandenberg AFB and/or Cape Canaveral AFS. A single base is preferable if it leads to economies. Restrictions on launch azimuths at Cape Canaveral AFS may prevent it from satisfying all operational requirements as a single base. The maximum payload for high altitude, low inclination missions from Vandenberg AFB is less than from Cape Canaveral AFS because of launch azimuth constraints and a higher latitude. This may prevent Vandenberg from satisfying all requirements for a single base.

6. [redacted] Satellite intercept forces would be assigned to ADC under operational control of CINCONAD. Approval authority to initiate intercept activities would reside with the National Command Authority (NCA). Requirements of Unified/Specified Commands for satellite negation would be submitted to the JCS. Those approved would be referred to the NCA for decision and CINCONAD would be alerted for a potential mission. The mission would be conducted upon receipt by CINCONAD of an authenticated execution order from the NCA.

7. [redacted] Radar and optical sensors of the Space Detection and Tracking System (SPADATS) would be used to track target satellites and generate element sets to describe their inertial position. Elements, to the accuracy of the SPADATS catalog, would be continuously maintained for preliminary targeting calculations for all potentially hostile resident satellites. Element sets would be updated as necessary to improve accuracy after CINCONAD is alerted to the possibility of an intercept mission. Computational support would be provided by the Space Computational Center (SCC) in the NORAD Cheyenne Mountain Complex (NCMC). Dedicated targeting computers may be included in the intercept force.

8. [redacted] CINCONAD would have the option of requesting priority tasking of b(1)

if CONAD sensors alone could not provide the target position accuracy required for interception. Priority tracking could be requested any time after CINCONAD is alerted to the possibility of an intercept.

9. [redacted] In the case of quick reaction intercepts against newly launched satellites, only one or two orbits are available for tracking. It is assumed that the intercept force is alerted for such a mission at least 24 hours in advance of the launch based on intelligence and the tactical situation, i.e., we would expect the Soviets to replace satellites recently negated and would be prepared to take out the replacements as soon as they are so identified.

10. [redacted] Midcourse maneuvers are feasible for interceptors on high altitude or quick reaction missions. Remote stations of the Air Force Satellite Control Facility (AFSCF) would track beacon signals radiated by the interceptors. The AFSCF would transmit data describing interceptor position to the targeting computer. SPADATS and b(1) data would be used to define target position and evasive maneuvers that might occur. Midcourse maneuver instructions would be computed and passed to the AFSCF for transmission to the interceptor.

11. [redacted] SPADATS and b(1) would continue to monitor target satellites after intercept occurs. Data would be reported to the SCC in the NCMC for a damage assessment analysis.

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4 Attachments
1. Expanded Rationale
2. Preferred Solutions
3. Special Comments
4. Distribution List

EXPANDED RATIONALE

1. Threat.

a. [redacted] The primary justification for a U.S. satellite interceptor stems from the need to negate military support satellites.[6] The Soviet threat also contains a FOBS capability, and an operational deployment of 6 to 8 non-nuclear satellite interceptors.[7] However, these space weapons represent less of a driving requirement. In the case of FOBS, a limited number of SS-9 Mod 3 missiles may be deployed; however, it appears more logical that they would be used in the DICBM mode rather than as FOBS. In the case of Soviet ASATS, it is not always possible for a CONUS-based interceptor to counter-intercept the ASAT before it accomplishes its mission. Reaction time and flight time requirements make it difficult to build an interceptor with such rapid response. Even though counter-interception cannot be assured for all situations, the existence of an operational interceptor would deter Soviet attacks on U.S. satellites. While this deterrence and partial capability to counter-intercept contribute to defense of U.S. satellites, they do not represent a complete defense. Satellite survival aids are also required.

b. [redacted] Nominal satellite deployments for space missions currently performed by the Soviets require 58 satellites. In 1981 the nominal number of satellites is projected to increase to 89 with addition of the following missions: air surveillance, ballistic missile surveillance, nuclear burst detection, and signal intelligence. Thirty of the 89 satellites in 1981 are expected to be at geostationary altitude (about 20,000NM).

c. [redacted] Soviet military satellites are listed in Table I. The information is taken from the DIPP. Projected numbers of satellites are shown for each mission area in 1981. The threat is broken out in three categories according to type of orbit: satellites in approximately circular orbits with altitudes less than about 1000NM; those in highly elliptic, Molniya type orbits with perigee around 200NM and apogee around 20,000NM; and high altitude orbits which are generally geosynchronous around 20,000NM altitude.

TABLE I

SOVIET MILITARY SATELLITES

PROJECTED FOR 1981

BELOW 1000 NM	ELLIPTIC	ABOVE 1000 NM
2 PHOTO RECON	4 MOLNIYA	4 METEOROLOGY
4 ELINT	3 MISSILE SURV.	3 STATSIONAR
4 METEOROLOGY		3 SIGINT
5 OCEAN SURV.		18 NAVIGATION
5 AIR SURV.		2 MISSILE SURV.
32 COMM REPEAT		

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f. [redacted] Most applications of military space support result in increased efficiency of existing combat forces. For this reason, tactical space support will be a valuable asset in protracted wars of attrition like the Soviets have supported against us twice in the last 25 years. In wars of attrition, efficiency of forces is an important characteristic--perhaps of primary importance. By negating hostile satellites, this support can be denied the enemy.

2. [redacted] (U) Operational Requirement.

a. [redacted] The requirement to negate b1 resident satellites is derived by identifying those Soviet satellites in the 1981 threat that are credited with significant tactical or strategic support roles. The intercept force is sized according to the 1981 threat because it is the earliest completion date for an orderly program to develop and fully deploy a non-nuclear intercept force. Soviet military space missions are listed in Table I. A negation capability is required against photographic reconnaissance, electronic intelligence, meteorology, ocean surveillance, air surveillance, signal intelligence, navigation, and the b(1) communication satellites. Assuming nominal deployments, this list includes b(1) low altitude satellites (below 1000NM), b(1) in elliptic orbits, and b(1) high altitude satellites (above 1000NM). High altitude satellites are generally in geosynchronous orbits around 20,000NM altitude.

b. (S) The number of high altitude satellites is driven by the b(1) precision navigation satellites that are projected. It will be assumed that destruction of 1/3 of these satellites will degrade the precision features of performance on which tactical utility is dependent. This reduces the required number of high altitude negations to (b1)

c. [redacted] The required capability against resident satellites

is rounded to multiples of b(1) and stated as b(1) low altitude negations, b(1) elliptic, and b(1) high. These negations must be accomplished within 24 hours of an execution order, as explained in the following paragraphs.

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e. [redacted] The previous examples demonstrate that rapid response is necessary in some scenarios if the satellite intercept force is to satisfy military objectives. Full realization of the potential of satellite negation as a political instrument of national power also requires a responsive force. Flexible response attributes of satellite negation are used to greatest advantage early in a developing conflict. It is at this time that the political impact of employment is greatest in the sense that (1) genuine resolve has been demonstrated with a significant military action and (2) employment and the resulting change in relative military strengths has possibly occurred early enough to prevent further conflict. Employment later than 24 hours is still expected to produce the obvious material advantages in an ensuing conflict; for example, degraded tactical air strike effectiveness will occur from loss of navigation satellites. However, the less obvious, but very important political advantage of employment early enough to completely avert conflict on earth would be lost.

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(DICBM) mode rather than as FOBS. The DICBM mode results in shorter flight times and better accuracy. A negation capability is not required against the missile surveillance system because it is assumed not capable of battle management support. Its role as an early warning system does not warrant negation action.

g. [redacted] In addition to the capability for b(1) low, b(1) elliptic, and b(1) high altitude negations within 24 hours; b(1) quick reaction low altitude missions are required. These will provide the capability to negate newly launched payloads early in their orbital lifetime. Negation within the first two orbits is required. This is a compromise between the desirable objective of negating prior to completion of the first orbit and the practical necessity of allowing time for target tracking and interceptor fly-out.

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i. [redacted] In some cases, quick reaction negations would also be effective against the type of orbital satellite interceptor which the Soviets have demonstrated. Counter-interception while the hostile interceptor is in phasing orbits enroute to its target would be possible for some attack geometries, particularly if the Soviet ASAT is on a high altitude mission where time spent in phasing orbits enroute to the target is longer.

j. [redacted] A quick reaction capability against geosynchronous satellites is a desirable goal but not a requirement at this time. The high altitude threat has not been demonstrated sufficiently to require this capability. A reasonable goal would be negation prior to the new satellite being in a stable mission orbit for 24 hours.

PREFERRED SOLUTION AND ALTERNATIVES

1. [redacted] (U) Performance Objectives.

a. [redacted] The probability of successfully accomplishing those b(1) satellite negations specified as the operational requirement in Section IIB should be 0.9 or higher. A more specific statement can be made when sensitivity of total system cost to this probability is defined during the development program.

b. [redacted] Mission capabilities of satellites should be negated promptly after attack. Optimally, damage to the satellite should be sufficient so that verification of negation can be accomplished within 24 hours of the attack execution order. Verification will be based on physical damage to the satellite, sudden tumbling or orbit changes, loss of telemetry, or loss of mission related radiation. It is desirable to inflict sufficient damage so verification can be based on physical damage or tumbling. The minimum essential requirement is to achieve damage that will negate the satellite mission within 24 hours of the execution order, and which can be verified within a few days of the attack.

2. [redacted] (U) IOC/FOC Goals.

a. [redacted] The Soviet space threat described in attachment 1 is projected to be fully deployed and operational by FY82; therefore, the optimum FOC date is FY82. FOC includes the low altitude, elliptic orbit, high altitude, and quick reaction negation capabilities described in section IIB.

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c. [redacted] The minimum essential requirement is to achieve FOC for low altitude negations by FY82; that is, b(1) low altitude negations within 24 hours of an execution order.

3. [redacted] (U) Alternative Solutions. Potential solutions are described in order of preference.

a. [redacted] (U) Air and Ground Launched Interceptors.

(1) [redacted] These systems represent the preferred solution because of technology availability, performance, and cost considerations. Two types of non-nuclear terminal homing stages are candidates. One is small, weighing 10-20 lbs, and destroys the target by collision at high relative velocity. The other weighs 500-1000 lbs and destroys the target by deploying a cloud of rods or pellets, or with an explosive warhead. Both use LWIR sensors for terminal guidance.

(2) [redacted] The miniature (10-20 lb) terminal stage is preferred because it results in systems with greater operational flexibility and considerably lower total cost. It is essential to the air-launch type of system. The advantages of air-launch systems stem from the mobile and reusable first stage--the aircraft. This drastically reduces missile performance requirements because it can be launched at altitude and in the orbital plane of the target satellite. It also reduces, by a factor of two, total costs compared to ground launch missile systems. The small air launch missile permits rapid and economic reload and refire.

(3) [redacted] The air launched concept has been considered primarily for low altitude intercept missions. It may also be applicable to high altitude missions; however, a considerably larger booster would be required. If ground launched missiles are required for high altitude missions., the miniature terminal stage is still preferred over the larger stage because it permits smaller, less costly missiles to be used.

(4) (U) Technology appears to be available for both the miniature and the large terminal stages. The miniature stage is a slightly higher risk because a complete prototype has not been built and unforeseen problems may arise when the individual components are integrated into a single stage. The components perform individually as required; technology advances are not necessary.

(5) [redacted] A reasonably high confidence engineering development program can be configured to produce an operational interceptor force by FY82. Development of miniature stages should be stressed with the larger stage being carried along as a fall-back position only until the miniature stage has been proven satisfactory.

b. [redacted] (U) Space Launched Interceptors. The cost of high

altitude intercepts can be reduced by use of the b(1) . The unmanned upper stage of the b(1) appears essential if significant savings are to be realized. This concept should be investigated. It is not listed as the preferred approach because the status of the b(1) within the DOD, and to an even larger extent, the status and performance of the upper stage are not well defined; therefore, intercept systems using b(1) have an indefinite operational availability date. If these uncertainties are removed, the concept becomes attractive for high altitude negations.

c. [redacted] (U) Laser Negation Systems.

(1) [redacted] Ground, air, or space based laser negation systems offer great promise for future anti-satellite operations. Detailed studies have been done on ground and air based systems. Less analysis has been done for space basing; however, this may be the better approach for satellite negation with lasers because it avoids the problems associated with atmospheric attenuation.

(2) [redacted] Space basing may be considered for laser systems or any other negation technique where operation from space is technically desirable. Operational implications of negation systems that reside in space are not well known. Advantages may be increased opportunities for intercept and decreased response times between the execution order and completion of the intercepts. Disadvantages may be more complex command and control systems and low survivability in a space conflict environment.

(3) ([redacted] Ground or air based lasers appear incapable of achieving prompt, readily verifiable destruction of all satellites in the threat by 1982. They appear capable of achieving prompt kill on some low altitude satellites. Total cost for development, deployment, and operation would be several times the cost of interceptor systems. The full operational capability required could not be achieved with lasers by 1982.

(4) [redacted] Laser technology is developing. Laser weapons offer great promise as a second generation satellite negation system.

d. [redacted] (U) Electronic Warfare Systems.

(1) [redacted] Electronic warfare (EW) systems have been proposed for negating satellites. Since its inception,

EW has been a dynamic contest between offense and defense. First one side is successful, then the other. This was true with the earliest EW during WWII and continued to be true in the Southeast Asia and Mideast wars.

(2) [redacted] The effectiveness of EW systems cannot be assured in a reactive environment where the enemy resorts to electronic counter-countermeasures (ECCM). ECCM techniques exist to counter EW methods. In some cases geometry alone would preclude EW against Soviet satellites unless the EW source were located within the Soviet Union.

(3) [redacted] EW appears to be a low confidence way of negating satellites for prolonged periods. EW systems appear to have merit primarily as an adjunct to a more direct means of negation. As space conflict develops, EW can be expected to assume this adjunct role. It is not recommended as a means for an initial, basic satellite negation capability.

e. [redacted] (U) Negation of Ground Elements of Space Systems.

(1) [redacted] In addition to satellites, space systems also contain ground elements in the form of data read-out or command and control stations. Obviously the systems can be negated by attacking these elements.

(2) [redacted] Capabilities to attack ground elements are not of primary concern in this ROC because they represent a significantly different type of conflict. Such attacks involve violation of sovereign territory, and possibly collateral damage and loss of human lives. These side effects are especially undesirable in situations where, for example, the U.S. and U.S.S.R. may not yet be in direct conflict with each other. The side effects represent a considerable escalation in comparison to an attack in space.

(3) [redacted] The dissymmetry between U.S. and Soviet ground elements is an important factor in determining whether attacks on these elements would work more to the advantage of the U.S. or the U.S.S.R. The U.S. has ground stations in foreign countries and along the U.S. coast. The Soviets generally use interior locations within their borders. This geographic dissymmetry together with the fact that the U.S. is an open society while the U.S.S.R. is a tightly controlled closed society makes it easier for the Soviets to attack U.S. ground stations than vice versa. It would appear contrary to U.S. interests to escalate a conflict to the level where these dissymmetries

could be exploited by the Soviets. It would be more to the advantage of the U.S. to negate space systems by attacking satellites in space where the intrinsic posture of the U.S. is more in balance with the U.S.S.R.

SPECIAL COMMENTS (U)

1. [redacted] (U) Survivability.

a. [redacted] At this early stage in the development of space weapons and space warfare, there does not appear to be a convincing rationale for hardening a satellite intercept system against nuclear effects. It does appear prudent, however, to harden interceptors against collateral damage, at least during the coast phase of flight, if the cost is acceptable. Counter-interception of U.S. interceptors during flight is not feasible because they would use direct ascent or fly-by trajectories where the time of flight is too short to allow for counter-interception with a ground based weapon. It seems unreasonable to hypothesize that a defensive nuclear weapon will be shot out from the satellite being attacked because such a weapon would be likely to damage or destroy the satellite.

b. [redacted] Missiles may be launched from unhardened silos or above ground launchers. Hardened facilities are not considered to be a requirement although it may be less costly to duplicate existing hardened launch facilities than to develop soft facilities. The first generation satellite intercept capability is envisioned primarily for limited conflicts where the CONUS is not under attack. If attacks on the CONUS are likely, the force would best be employed in the preliminary stages of the confrontation in an effort to degrade the enemy's military capability so that in his reassessment of the situation he would be deterred from nuclear attack.

c. [redacted] A controlled nuclear attack intended to destroy the U.S. satellite intercept force is unlikely because of the dispersed force that is planned. Collateral damage from attacks on both U.S. space launch bases and two primary air defense bases would be a severe escalation in a confrontation where CONUS attacks had not yet occurred. Any rational enemy would have to be concerned that such an attack would trigger a large nuclear response from the U.S.. Protecting his satellites with a preemptive attack of this type does not appear worth the risk. The attack may save the enemy's satellites but it would be done at the risk of sacrificing the advantages of a preplanned first strike in a large scale nuclear exchange.

2. (U) Safety. Air-launched missiles will be launched off the coasts of the U.S. to assure that the spent boosters will impact in the Atlantic or Pacific Ocean. Ground launched missiles will be controlled during the operational phase by range safety facilities, under CONAD control, located at the launch bases.

3. [redacted] (U) Aircraft Compatibility.

a. [redacted] Air launch operations are envisioned from F-106 or F-15 aircraft, although other aircraft are candidates. The interceptor missiles would be launched from an externally mounted rack on the aircraft. Aircraft supporting this mission would have a specially modified fire control system (FCS) in addition to the external launch rack adapter. The modifications would not adversely affect aircraft performance or degrade the primary air defense intercept capability. The major modification to the FCS consists of the addition of hardware and software changes which improve the capability to manually or automatically control the aircraft speed, altitude, attitude, heading and geographical position. The missile is fired automatically at the proper instant and the aircraft recovers to its home base or as directed. The missile launch adapter replaces one or both of the external fuel tanks which permits the aircraft to fly the normal configuration for air defense missions.

b. [redacted] Approximately 14 aircraft would be modified for the mission and assigned to two bases. This number of aircraft is based on historical availability and reliability data for F-106 aircraft in ADC. It accommodates 4(U) low altitude intercepts within 24 hours with no more than three missions per aircraft. The calculation does not assume repair of aircraft that return from previous missions with malfunctions. A minimum of two aircraft at each base would be available at all times on an appropriate state of readiness, to support the satellite intercept mission.

4. [redacted] (U) Communications Security.

a. [redacted] The possibility of electronic warfare being used against the ground-to-air data link for aircraft or the ground to space command and control link for ground launched missiles is of concern. The former link would be used to pass target position data to the aircraft computer, the latter link to pass midcourse maneuver commands to missiles on high altitude or quick reaction missions. It may be possible for an enemy to spoof the system or collect sensitive target position information from these links. Additionally, disruption of the links by ECM may be possible. An analysis of the data links and associated terminal equipment is required in accordance with AFR 205-7 to determine the need for encryption and ECCM.

5. [redacted] (U) Facilities.

a. [redacted] Air launch operations could be conducted from existing Air Force bases having established operational units of air defense aircraft. Aircraft support facilities could be furnished as part of the air defense function. The satellite intercept organization could operate as a tenant organization on the base. The only peculiar facilities required would be used for support of the satellite intercept missile.

b. (U) Ground launch operations could be conducted from Cape Canaveral AFS and/or Vandenberg AFB as a tenant organization. The following dedicated facilities may be required: missile launch control centers, missile silos or launch pads, missile and payload maintenance and support facilities, and a range safety facility. In addition, environmental storage facilities for missiles and payloads would be required.

6. [redacted] (U) Environmental Impact. No significant detrimental impacts on the environment are expected from deployment and operation of non-nuclear satellite interceptors. If high power lasers or electronic warfare systems are proposed, an assessment of their environmental impact will be required. A written environmental assessment, in accordance with AFR 19-2, will be made by AFSC when the space defense system is sufficiently defined.

7. [redacted] (U) Munitions and Hazardous Materiels Disposal. Standard procedures, in accordance with AFM 127-100, AFM 127-201, and T.O. 11A-1-42 will be followed for disposal of munitions and hazardous materiel components. Components in this category which may be included in the space defense system are solid and/or liquid propellent rocket motors, and possibly high explosive warheads.

8. [redacted] (U) Automatic Data Processing Equipment (ADPE). ADPE is required to determine the location of target satellites based on sensor inputs from SPADATS, compute guidance instructions for satellite interceptors, and perform post-attack damage assessment. Maximum effective use will be made of existing ADPE for these functions. Candidate ADPE facilities are located in the NORAD Cheyenne Mountain Complex and Air Force Satellite Control Facility. Dedicated ADPE will be used to the extent it is impractical to use existing facilities. Policies of AFR 300-2 and AFR 800-14 will be followed for development and operation of ADPE. A Joint Computer Working Group, chaired by AFSC, will develop a Computer Resources Integrated Support Plan

which will identify responsibilities for management and technical support of computer programs.

9. (U) Transportation and Packaging. Transportation and packaging shall be in accordance with AF directives in the 71, 75 and 76 series regulations and manuals. All mission, ground handling and support equipment should be transportable by existing commercial or military transportation modes, surface and air, without imposing unusual transportability problems. AFR 80-18 will be used to identify any items of materiel or equipment which may present a transportability problem. Fragile items and unique materiels handling requirements shall be held to a minimum and there shall be no items, excluding crypto, requiring technical escort.

10. [redacted] (U) International Treaties.

a. [redacted] There are no treaties prohibiting development, test, or employment of non-nuclear satellite interceptors. The status of most satellites is not affected by treaties; however, the Strategic Arms Limitation Agreements contain provisions that might constrain employment of an interceptor against certain satellites in particular situations. The signatories agreed not to interfere with each other's national technical means of verifying compliance with the ICBM and ABM limitations. This apparently includes means of verification such as photo reconnaissance satellites capable of monitoring ICBM and ABM deployments. However, the fact that photo reconnaissance satellites can also be used to perform military missions appears to challenge the sanctuary status implied by these provisions.

b. [redacted] Development and deployment of a U.S. non-nuclear satellite interceptor should be conducted ~~in a manner~~ consistent with the Strategic Arms Limitation Agreements. Care must be exercised to distinguish the U.S. satellite interceptor program from prohibited ABM development activities or prohibited ICBM or ABM deployments.

11. [redacted] (U) Meteorological Support.

a. (U) Meteorological support similar to that provided for current aircraft and space launch operations will be required for the Space Defense System. No extraordinary requirements are foreseen.

b. [redacted] The degree of accuracy required from SPADATS is not expected to generate requirements for special meteorological support for purposes such as reducing atmospheric refraction errors of SPADATS sensors. From an operational viewpoint, this degree of precision is undesirable because it implies the need to collect precise SPADATS observations on each target satellite and perform orbit computations immediately prior to interception. The requirement for a responsive intercept system makes it preferrable to operate with SPADATS data that is already available within the associated computers when the intercept execution order is issued, and for this level of precision, atmospheric refraction errors are insignificant.

12. [redacted] (U) Maintenance Concept.

a. [redacted] (U) Summary.

(1) (U) This maintenance concept provides guidance for the development of an organizational and intermediate production maintenance capability by ADC and depot production and engineering management maintenance capabilities by AFLC, AFCS and AFCD.

(2) [redacted] Excluded from this maintenance concept is the air launching vehicle and any existing facilities that would tie into this program, such as NCMC, AFSCF, SCC, etc. A separate maintenance concept will be developed for the air launching vehicle at such time as the vehicle and operating bases are more clearly defined.

(3) [redacted] This maintenance concept would apply to the following anticipated segments/subsystems:

(a) Ground and air launched interceptors.

(b) Interceptor assembly, checkout facilities and alert ready vehicle storage.

(c) Ground launch facilities to include launch control center, launch pads and alert ready vehicle hangars.

(d) Dedicated tactical communications facilities.

(4) (U) Organizational and intermediate maintenance shall be accomplished by a mix of organic (military/in-service civilian) and contractor personnel. The military maintenance capability shall be developed to assure continued support of

all mission essential functions. In-service civilian and contractor personnel may be utilized to accomplish non-mission essential functions. In addition, in-service civilian personnel may be utilized for training purposes. The distribution of the mix of organic/in-service civilian and contractor personnel shall be developed and refined as system/hardware base line configurations are established.

(5) (U) The following documents shall be used in developing detailed maintenance production and engineering management plans and principles: AFRs 8-2, 26-10, 26-12, 65-3, 66-6, 66-14, 66-15, 66-21, 66-24, 66-31, 66-44, 66-45, 74-2, 80-5, 80-14, 80-18, 80-23, 80-46, 82-2, 82-7, 100-6, 100-22, 400-44, 800-8, 800-11, 800-14; AFMs 65-110, 65-265, 66-1, 67-1 and 00-20 series of TOs.

(6) (U) To insure system/subsystem maintainability, all maintenance during Initial Operational Test and Evaluation shall be performed by ADC personnel in an operational environment unless waived by ADC.

(7) (U) Following IOT&E and prior to turnover in accordance with a Transition and Turnover Agreement (TTA), ADC maintenance personnel will assist the Program Office in subsystem/equipment maintenance.

(8) (U) This maintenance concept shall be used to guide the implementing, using/operating, support and participating commands during the system life cycle. Once this maintenance concept is approved by HQ USAF, it shall not be revised nor waived without ADC concurrence.

b. (U) Objectives: The maintenance program set forth in this document is designed to assure the maximum support of the operational missions by:

(1) Assuring the establishment of an adequate organic organizational, intermediate and depot level maintenance posture for all system, subsystem/equipments, including support equipments, but excluding leased communications circuits and equipments, prior to turnover to ADC and transition to AFLC.

(2) Insuring the timely development and acquisition of adequate maintenance facilities and support items.

(3) Insuring that maintenance requirements are developed, acquired, tested and in-place prior to initial deployment of the system.

(4) Demonstrating by tests that reliability requirements are met and that the maintainability parameters can be met by organic maintenance personnel during the deployment phase.

c. (S) (U) Determination of Maintenance Functions: Maintenance functions will be established in accordance with AFR 66-14 and managed in accordance with AFM 66-1.

(1) (U) AFLC, AFCS and AFCD will establish maintenance engineering management activities within the organizational structures in accordance with AFM 26-2 and their command policies.

(2) (U) AFLC, ADC, AFCS and AFCD will establish maintenance production activities in accordance with AFR 66-14, AFM 66-1 and applicable command policies.

(3) (S) (U) The following rationale shall be used by AFLC, ADC, AFCS and AFCD in tailoring their maintenance engineering management and maintenance production activities for this system.

(a) (U) ADC's organizational and intermediate level maintenance capabilities will consist of an optimum on-site capability.

(b) (U) AFCS will develop an on-site maintenance capability for ground CEM subsystems/components to augment ADC's maintenance capability.

(c) (U) AFCD will maintain off-site depot level maintenance facilities for crypto equipments.

(d) (S) AFLC shall maintain off-site organic or contractor depot level maintenance facilities for all parts, assemblies, subassemblies, components and end items and the emergency manufacture of unavailable parts for which a capability is not available on-site.

d. (U) Planning Documentation: Maintenance requirements shall be documented in accordance with AFR 80, 310 and 800 series of regulations. Such documentation shall be progressively refined and updated through concept formulation, definition, development, production and DT&E and IOT&E testing. To support maintenance analysis, data collection procedures in accordance with the 00-20 series of technical orders shall be implemented at the earliest possible date, but in no case later than start of IOT&E testing.

e. ([redacted]) (U) Maintenance Policy:

(1) ([redacted]) Repair Locations: Repairs shall be accomplished at operating locations (ground launch facilities, organizational and intermediate air launch maintenance facilities and dedicated tactical communications facilities), interceptor assembly, checkout and alert ready vehicle storage facilities, organic and contractor technological repair centers, cryptologic depots and precision measurement equipment laboratories as determined by ADC and AFLC. Repair locations for crypto subsystems/equipments, shall be as established in COMSEC documents. The interceptor assembly, checkout and alert ready vehicle storage facilities shall include intermediate level maintenance capability to repair, align and dynamic test for serviceability, unserviceable, repairable items removed at the organizational maintenance level. The contractor Optimum Repair Level Analysis (ORLA) recommendations for on-site versus depot level maintenance requirements and ADC/AFLC joint repair location determinations shall take into consideration location and quantity of operating locations, mission urgency, and the limited quantity of interceptors available. ADC and AFLC shall mutually determine the appropriate location for those maintenance capabilities which can jointly support both activities.

(2) (U) Corrosion Control: Corrosion control requirements to be implemented during the operational phase shall be developed by application of Data Item DI-S-3598. Corrosion control will be implemented at the organizational, intermediate and depot levels. Specific corrosion control requirements/procedures shall be included in applicable technical orders.

(3) (U) Programmed Depot Maintenance: On-site and off-site depot level maintenance shall be the responsiblity of AFLC. This maintenance shall be accomplished in accordance with the 00-25 series of TOs and AFR 66-14. Depot maintenance requirements for equipments not readily transportable to a TRC shall be accomplished on site by AFLC.

(4) (U) Inspection Requirements: Inspection requirements shall be documented by development of inspection requirements manuals and work cards in accordance with AFR 8-2 and applicable military specifications. The inspection requirements manuals and work cards shall be integrated into the Air Force technical order system and maintained in accordance with TO 00-5-1.

(5) (U) Calibration: Calibration shall be accomplished in accordance with AFR 74-2 and TO 33-1-14. It shall be the responsibility of AFLC (AGMC) to determine if an existing DOD Precision Measurement Equipment Laboratories (PMELs) have the capability to support this program or new PMEL(s) are required. In either case it shall be AFLCs (AGMC) responsibility to assure that adequate PMEL capabilities are available in sufficient time to support this program. Calibration requirements shall be determined from the calibration requirements summary, Data Item DI-S-3613. Individual mission equipment calibration instructions shall be included in the applicable equipment technical orders.

(6) (U) Time Change Requirements: Time change items to include time/frequency change intervals shall be identified in applicable equipment technical orders. Time change intervals calculations shall be based upon reliability analysis. Times to accomplish the time change items shall be included in maintainability calculations.

(7) (U) Failure Diagnostic Techniques: Maintenance computer programs shall be included at all levels for monitoring system health, predicting failures and diagnosing system and equipment failures. The programs shall be designated as an integral part of an overall maintenance system incorporating confidence checking routines, failure prediction routines, diagnostic routines, built-in test equipment and maintenance status monitoring and control centers. This maintenance system shall:

(a) (U) Provide a rigorous functional on-line program interleaved with the operational programs on a non-interference basis to monitor system health, predict system/equipment degradation and detect failures down to the line replaceable item. These checking routines shall be cycled often enough to assure maintenance of confidence in the system that reliability parameters are met. Detection of a fault shall cause the routine which disclosed the fault to be repeated a predetermined number of times to verify an error indication and eliminate the possibility of a minor parity error or a normal busy condition causing an error indication.

(b) (U) Provide off-line diagnostic routines which isolate fault down to the lowest replaceable item level. These diagnostic programs shall be capable of being run independently of the on-line operational programs and in-so-far as practical being automatically triggered by the on-line programs.

(c) (U) Maintenance computer program design shall be modular and include growth potential so that additional routines may be incorporated at a later date.

(d) (U) Be designed to enable average five skill level personnel to identify malfunctions to line replaceable items and lowest replaceable items.

(e) (U) Be written in a programming language compatible with the operational programs.

(8) ([redacted]) Structural Integrity Program: A structural integrity program similar to that required by AFR 80-13 for aircraft shall be implemented for the interceptors.

(9) ([redacted]) Storage. Storage requirements for the interceptors shall be furnished at a later date. Special handling or maintenance of spare/repair parts must be held to an absolute minimum in the interest of rapid replacement and maintenance. Spares and spares packaging must be designed for extended shelf-life consistent with system/subsystem life and environmental conditions to be encountered at storage locations.

(10) (U) Maintenance Practices: The remove, replace and repair concept shall be implemanted. All items identified as reparable at the intermediate levels shall be repaired on-site. Sufficient special tools, test equipment, mock ups and technical data shall be provided to support such on-site repairs and dynamic testing for service ability.

(11) (U) Levels of Maintenance: Organization, intermediate and depot levels of maintenance shall be in accordance with AFR 66-14 which requires maintenance be planned and accomplished to insure optimum effectiveness of systems and equipments and maintenance costs optimized as a factor in total system costs. ORLA recommendations shall be tempered by consideration of mission urgency, one/few-of-a-kind facilities and geographical dispersal of ground communication terminals. Costs must be considered in determining repair levels but shall not override mission requirements.

(12) (U) It is desirable that all organizational and intermediate level maintenance be within the capability of average five skill level maintenance specialist and mandatory that it be within the capability of the average seven skill level maintenance technicians, after completion of formal and on-equipment training periods.

(13) (U) Technical Data: All technical manuals shall be incorporated in the AFTO system. Technical manuals and drawings which are suitable for Air Force organic configuration control, support engineering, reprocurement and organization and intermediate maintenance must be made available. Contractors recommending the use of existing commercial manuals shall submit two copies of such manuals with their response to the Request for Proposal. Such commercial manuals contractors recommend for use shall be so evaluated for adequacy concurrent with source selection. No new manuals shall be written to MIL-M-7298C standards to satisfy the requirements of this program. Manuals are required at the system, facility and equipment levels. Technical manuals and plant-in-place documents, in manuscript format, must be available in sufficient time to support on-equipment training. Technical manual verification shall be accomplished in accordance with TO 00-5-1 and AFR 8-2 and page changes made prior to initial deployment. Work unit code manuals shall be programmed so as to implement maintenance data collection in accordance with the 00-20 technical orders at the earliest possible date, but in no case later than the start of IOT&E testing. All technical manuals must be adequate for use by the average five skill level maintenance specialist after a formal and on-equipment training period. Firm technical manual buy commitments shall be made concurrent with hardware buy commitments.

(14) (U) Special Considerations:

(a) Responsibility for maintenance of computer maintenance programs shall be as established in the ADC/AFLC Memorandum of Agreement and AFR 8-2. ADC's and AFLC's specific requirements for computer program technical data shall be furnished to the acquisition agency for inclusion in the Statement of Work and Contractor Data Requirements Lists.

(b) Design and engineering of the initial versions of this system shall take into consideration growth versions to assure the most economical acquisition of the total system.

(15) (U) Aerospace Ground Equipment (AGE): For the purpose of this document AGE is that equipment required to support mission equipment, i.e., special tools, test equipment, etc.

(a) (U) AGE will be provisioned in accordance with AFPI 71-665.

(b) (U) Prior to initial deployment, all AGE shall

be in place and have been identified as being required and authorized for use through applicable publications, i.e., table of allowances or technical orders and have been identified to a national stock number.

f. (U) Maintainability: Qualitative and quantitative maintainability requirements shall be established in the maintainability program in accordance with MIL-STD-470. Maintainability concepts and characteristics shall be incorporated into system/subsystems/equipment design to optimize requirements for manpower, training, special skills, test equipment, special tools, technical data and logistic support. All configuration items (CI) specifications shall include mean-time-to-repair (MTTR) and maximum corrective maintenance times. The scheduling and time phasing of DT&E and IOT&E shall include adequate provisions for maintainability test/demonstration. Test and evaluation to verify required maintainability parameters shall be in accordance with AFR 80-14 and MIL-STD-471. All test plans and procedures shall be coordinated with ADC prior to the start of the tests.

g. (U) Reliability: A reliability program in accordance with AFR 80-5 and MIL-STD-785 shall be established to identify reliability requirements as system/subsystem/equipment configurations are refined. All CIs specifications shall include specified mean-time-between-failures (MTBF) as defined in MIL-STD-781. The CIs shall be tested during DT&E using MIL-STD-781 test level "E" or greater. Test and evaluation of system/subsystems/equipments to verify the reliability requirements shall be in accordance with AFR 80-14 and MIL-STD-781. All test plans and procedures shall be coordinated with ADC prior to the start of the tests.

h. (U) Maintenance Organization: The organizational and intermediate level maintenance organization shall be configured in accordance with AFM 26-2. Optimum maintenance manning requirements shall be established as system/subsystem/equipment configuration are defined.

13. [redacted] (U) Integrated Logistics Support Concept (AFR 800-8).

a. (U) Maintainability/Reliability (M/R). The maintainability and reliability parameters shall be initially established during the Conceptional Phase and continually refined through the Production Phase. The M/R parameters, to include maximum and minimum figures and test requirements along with pass/fail criteria, shall be documented in the System and

Configuration Item Specifications. The requirements for demonstrating the achievement of the reliability and maintainability parameters are set forth in paragraphs 6 and 7 of the Maintenance Concept.

b. [redacted] (U) Maintenance Planning (MP). A Maintenance Concept has been prepared in accordance with AFR 66-14.

(1) (U) ADC shall employ a mix of military, in-service civilians and contractor personnel to carry out its organizational and intermediate maintenance responsibilities. The in-service civilian personnel participation shall be limited to upgrade training of military personnel and use in some non-direct mission support areas. Contractor personnel participation shall be limited to Contractor Field Service (CFS) and Field Service Representatives (FSRs) to provide added maintenance training and technical expertise during the initial deployment phase. ADC's maintenance production management functions at the organizational and intermediate levels shall be established in accordance with AFR 66-14 and AFM 66-1. AFLC shall develop maintenance production and maintenance engineering capabilities for: programmed depot maintenance, configuration control, Technical Order maintenance, operational engineering, spares support maintenance of ADC/AFLC, mutually agreed to computer programs, and support of Precision Measurement Equipment beyond the capabilities of the PMELs designated to support the System. AFCS shall develop a maintenance production and maintenance engineering management capability for maintenance in accordance with TO 00-25-108 and maintenance of Plant-in-Place records. AFCD shall develop a maintenance production and maintenance engineering management capability for: depot maintenance, operational engineering and spares support, and for crypto equipments. Intermediate maintenance of Precision Measurement Equipment will be accomplished by AGMC designated Precision Measurement Equipment Laboratory(ies).

(2) [redacted] (U) Functions to be performed by organizational, intermediate and depot maintenance production organizations are as follows:

(a) [redacted] (U) Organizational Maintenance.

1 [redacted] Phased inspections of all mission equipment. Included in the mission equipment category are the interceptor weapons (warhead, booster, internal guidance and release mechanisms), launch complex, dedicated ground

tracking and guidance systems and interceptor subsystem build-up, and mating of subsystem to form the interceptor weapon facilities.

2 (U) Servicing, alignment and lubrication of all mission equipments.

3 (U) Trouble shooting.

4 (U) Removal and replacement of assemblies, subassemblies and components.

5 (U) Corrosion prevention.

6 (U) Report maintenance actions in accordance with 00-20 series of Technical Orders.

7 (U) Status reporting in accordance with 65 series of AFMs and ADC supplements thereto.

(b) [redacted] (U) Intermediate Maintenance.

1 (U) Corrosion prevention and control.

2 (U) Repair of unserviceable assemblies, subassemblies and components.

3 (U) Installation of modifications designed for installation at the intermediate level.

4 (U) Report unsatisfactory conditions in accordance with TO 00-35D-54.

5 (U) Calibration, certification and repair of Precision Measurement Equipment designated for servicing at the operating unit intermediate level.

6 (U) PMEL(s) (to be designated by AGMC) shall be responsible for calibration, certification and repair of designated equipments.

7 [redacted] Build-up of interceptor subsystems and mating of subsystems to form the interceptor weapon.

8 (U) Report maintenance actions in accordance with 00-20 series of Technical Orders.

(c) (U) Depot Maintenance.

1 Technical assistance and maintenance beyond the responsibility and/or on-site capabilities of ADC.

2 Repair of unserviceable assemblies, sub-assemblies and components beyond ADC's on-site capabilities.

3 Installation of modification designated for installation at the depot level.

4 Programmed depot maintenance.

5 Operational engineering of Class II, III, IV and designated Class V modifications.

6 Updating of Technical Orders, crypto Technical Manuals and Plant-in-Place Drawings.

7 Configuration control (excluding computer programs mutually agreed to as being ADC's responsibility in accordance with AFR 8-2 and ADC/AFLC Memorandum of Agreement).

8 Maintenance and management of computer programs (excluding those mutually agreed to as being ADC's responsibility in accordance with AFR 8-2 and ADC/AFLC Memorandum of Agreement).

9 Repair and calibration of Precision Measurement equipment beyond the designated PMEL(s) capabilities and maintaining of Air Force Reference Standards.

10 Corrosion prevention and control.

11 Report maintenance actions in accordance with 00-20 series of Technical Orders.

(3) (U) The requirement for contractor support of AFLC's Technological Repair Centers (TRCs) shall be determined on a case-by-case basis as system and hardware/computer program configuration are defined.

c. [redacted] Support and Test Equipment (SE). Aerospace Ground Equipment (AGE) shall be provisioned in accordance with AFPI 71-685. All special tools and test equipment required and authorized for use during the deployment phase shall be assigned National Stock Numbers, documented in Table of Allowances and Technical Orders as applicable and be in-place 30 days prior to the start of the Deployment Phase testing. Individual equipment calibration instructions shall be included in

applicable equipment technical orders. AFLC (AGMC) shall be responsible for designating and upgrading existing PMELs or the establishment of adequate (facilities, equipment, procedures and manpower) new PMELs in time to support this program. Sufficient bench-check facilities for dynamic test for proper operation within TO specified tolerances shall be provided for items assembled, repaired and inspected at the intermediate level. At the time of turnover to ADC, all equipment shall have 50 percent or more of its calibration period remaining. Sufficient automatic test capabilities shall be built into the interceptor and launch facilities to monitor the interceptor's health and isolate faults to the LRU while the interceptor is on the launch PAD.

d. (U) Supply Support (SS). Supply support shall be AFLC wholesale management in accordance with AFM 67-1. All spares/repair parts shall be supplied to the user via the IM (Government depots) to user concept. AFLC shall accomplish spares provisioning, source coding and provide ISSLs for all mission and mission support equipment in sufficient time for ADC to budget, requisition and receipt for spares, in quantities required to support the approved maintenance concept, 30 days prior to start of the Deployment Phase testing. All spares will be Nationally Stock Numbered. During production phase, AFSC shall provide the user a recommended Real Property Installed Equipment (RPIE) spares initial stocks listing in sufficient time for ADC/or host base budgeting and completion of spares lay-in 30 days prior to the start of the Deployment Phase.

e. (U) Transportation and Handling (TH).

(1) Transportation and packaging shall be in accordance with AF directives in the 71, 75 and 76 series regulations and manuals. All mission, ground handling and support equipment should be transportable by existing commercial or military transportation modes, surface and air, without imposing unusual transportability problems. AFR 80-18 will be used to identify any items of materiel or equipment which may present a transportability problem. Fragile items and unique materiels handling device requirements shall be held to a minimum and there shall be no items, excluding crypto, requiring technical escort.

(2) During the development and production phases, the acquisition agency will be responsible for transportation and handling matters. However, any matters pertaining to transportation, handling or packaging which will impact on logistics

support during the deployment phase will be coordinated with the appropriate AFLC AMA's Packaging and Transportation Support Division (DSP).

(3) During the deployment phase, normal transportation procedures will be used for delivery of materiel. For those items which may be outsized for movement by existing transportation resources, disassembly to the extent practical will be considered for shipment to the destination.

f. (U) Technical Data (TD).

(1) Technical data necessary to manage the conceptional/production phases and to operate, manage, maintain and support the deployment phases shall be procured and/or developed in accordance with AFR 310-1.

(2) Technical manuals, RPIE manuals, engineering data and plant-in-place records suitable for Air Force organic configuration control, support, engineering, reprocurement, computer program maintenance and development, and organizational and intermediate maintenance are required. Technical manuals (excluding those applicable to ADC computer program maintenance) will be integrated into the Technical Order system in accordance with AFR 8-2. Existing commercial manuals recommended for use shall be evaluated for adequacy prior to award of a production contract and firm technical manual buy commitments shall be made concurrent with hardware buy commitments. No new manuals shall be written to MIL-M-7298 standards. Manuals are required at the systems, site, facility, set and equipment levels. New or updating of existing manuals and plant-in-place drawing will be required for all remote interface locations. All technical manuals and plant-in-place drawings, in final format must be available before entering the Deployment Phase. Technical manual verification shall be accomplished in accordance with AFR 8-2 and TO 00-5-1 and quickpage changes shall be completed prior to completion of IOT&E (System Testing). This verification requirement applies to commercial manuals evaluated for adequacy and conditionally accepted for use prior to award of the production contract. Work Unit Code Manuals shall be programmed in order to implement AF Maintenance Data Collection procedures no later than turnover to ADC. Prior to the completion of IOT&E (System Testing) of the Fully Operational Site maintenance discrepancies shall be documented by completion of AFSC 258/258-4 forms. All technical manuals must be adequate for use by the average Air Force 5-skill level maintenance specialist/repairman after a minimum of formal and on-equipment training period. Wiring lists shall be in point-to-point format and include all intermediate

points. Logic diagrams shall be on the basis of data flow. Plant-in-place drawings and drawing lists shall be developed to satisfy the requirements of AFM 100-19. Commercial technical data and computer programs, including vendor provided, accepted for use during the deployment phase, shall include government rights for unlimited use and reproduction. All technical manuals, excluding computer equipment and commercial manuals, accepted for use, shall include Block Diagrams and Maintenance Dependency Charts in accordance with Mil-M-24100B.

(3) During the deployment phase, ADC shall be responsible for: maintenance of RPIE manuals, functional/application and command unique computer program specifications, Positional Handbooks, computer program handbooks; AFLC shall be responsible for: maintenance of engineering data, hardware specifications, reprocurement data, Technical Orders, preservation and packaging information, operating system and maintenance computer program documentation including specifications; AFCS shall be responsible for: maintenance of Plant-in-Place drawings; AFCD shall be responsible for: maintenance of crypto technical manuals.

g. [redacted] (U) Facilities (PA).

(1) (U) Real Property requirements will be defined as part of the System design.

(2) [redacted] The implementation agency will be responsible for acquiring the Technical Support Real Property (TSRP) facilities, including the programming for the necessary 3080 and MCP funds. The TSRP facilities are all necessary items to support the primary mission. These include in addition to the necessary launch pad, build-up facilities, etc. and the RPIE installed therein, site preparation, physical security facilities, utilities (including power plant), roads, etc.

(3) (U) ADC will be responsible for acquiring Non-Technical Support Real Property (NSRP) facilities to include programming necessary MCP funds. NSRP will include all facilities to provide personnel support, such as dorms (EM and OFF), dining halls, recreation, and association utilities.

(4) (U) A site survey will be necessary to verify availability, condition and suitability of existing facilities.

(5) (U) Maintenance of TSRP and NSRP during the deployment phases will be in accordance with AFR 400-41 and other appropriate Air Force directives.

h. (U) Personnel and Training (PT).

(1) Military personnel to be assigned to the Space Defense System will be provided from available ADC resources and/or from Air Force world-wide resources as required.

(2) Qualitative and quantitative personnel requirements will be determined in accordance with AFR 80-46 as system configurations are defined. Initial estimates of organic personnel qualitative and quantitative shall be included in the PMP. The initial estimates will be refined as system hardware, computer program, facility and support requirements are definitized.

(3) ATC shall be responsible for initial and follow-on training of ADC and AFLC personnel. Training programs shall include formal classroom, on-equipment and crew training. When specific training requirements are known to ADC and AFLC, AF Forms 403 shall be prepared and submitted in accordance with AFR 50-9.

(4) The implementation agency shall acquire the necessary simulation/exercise hardware and computer programs for crew proficiency and maintenance personnel training.

(5) Human engineering shall be included in the system/equipment/computer program design.

i. (U) Logistic Support Resource Funds.

(1) The implementation agency will budget and fund for acquisition requirements, including TRSP facilities, except the following:

(a) NSRP.

(b) Training.

(2) ATC shall budget and fund for all operating and supporting command personnel training.

(3) ADC will budget and fund for all NSRP during the implementation process.

(4) ADC cost analysis support will include pricing of all operational and maintenance costs including military personnel estimate for the lifetime of the proposed system. As the system requirements become definitive and estimated expenditures are finalized, ADC will take action to include the requirement in the appropriate budget planning documents.

(5) Associated communications costs shall be the responsibility of AFCS for planning and budgeting purposes.

(6) AFLC shall be responsible for budgeting and funding for lay-in of spares and common AGE and for AFLC wholesale support during the deployment phase.

j. (U) Logistics Support Management Information.

(1) Development Production Phases.

(a) Engineering test and demonstration shall be managed in accordance with AFR 80-28, 80-5, 80-14, MIL-STD-471 and 781.

(b) Maintenance discrepancies shall be documented by completion of AFSC Forms 258.

(c) Military and in-service civilian personnel training requirements shall be managed in accordance with AFR 80-46.

(d) Aerospace Ground Equipment identification, selection, acquisition and provisioning shall be managed in accordance with AFPI 71-685.

(e) Spare parts provisioning shall be managed in accordance with AFPI 71-684.

(f) AFLC shall assign a Program Manager for the deployment phase of the system life cycle.

(2) Deployment Phase.

(a) Maintenance engineering and analysis will be managed in accordance with AFR 66-14 and other applicable Air Force directives in the 65 and 66 series.

(b) Maintenance management shall be in accordance with AFM 66-1.

(c) Spares and AGE will be managed in accordance with AFM 67-1.

(d) Configuration management of the hardware and AFLC-managed computer programs shall be in accordance with AFR 65-3.

(e) Operational readiness reporting shall be

managed in accordance with the Air Force 65 series of manuals as supplemented by ADC.

(f) AFLC shall develop and maintain an Integrated Logistics Support Plan for the life of the System.

(g) AFLC shall develop and maintain a Transportation and Handling Plan for the life of the system.

(h) Failure data reporting shall be in accordance with the 00-20 series of Technical Orders.

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14 AEROF/DOF, Ent AFB, CO 80912	3
AFCS/XPQ, Richards-Gebaur AFB, MO 64030	6
Director of Aerospace Safety (Hq USAF/IGDS), Norton AFB, CA 92409	3
AFLC/AQM, Wright-Patterson AFB OH 45433	15
AFSC/XR, Andrews AFB, Wash DC 20331	15
AMS/DPT, Scott AFB, IL 62225	3
ATC/XPQ, Randolph AFB, TX 78148	6
AFRES/DOOT, Robins AFB, GA 31093	3
HQCOMD USAF/DO, Bolling AFB, Wash DC 20332	3
MAC/DOQ, Scott AFB, IL 62225	5
CINCPACAF/XOOQ, APO San Francisco 96553	3
CINCSAC/XP, Offutt AFB, NE 68113	3
TAC/DR, Langley AFB, VA 23365	3
CINCUSAFE/DOQ, APO New York 09012	3
USAFSO/DOOX, APO New York 09825	3
USAFSS/XR, San Antonio, TX 78241	3
NGB/PRP, Wash DC 20310	3
AUL/LSE-69-587, Maxwell AFB, AL 36112	1
AFTEC/TE, Kirtland AFB NM 87115	1

HQ ADC:

XPQO	20
XPQA	2
XPQC	2
XPXY	2
DOF	2
DOV	2
DOT	2
LGX	2
LGM	2
DPX	2
XPH	2
HO	1